

Fundamentals of Organic and Biochemistry: Course Plan Proposal_(ver.1)

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Credits: 3 Hours weekly

*Course Description:

This course focuses on the basic principles of organic & biochemistry. And, how the two subject matters are related to each other? That form Bio-organic chemistry which is connected to living things.

*Pre requisites: Chemistry & Biology of High school 10&11&12

*Objectives:

Learner who successfully complete this course should be able to:

- Define the vocabulary of organic and Biochemistry
- Draw correct structural representations of organic molecules.
- Write reasonable transformations and mechanisms for alkanes, alkenes, alkynes, alkyl halides, alcohols, aromatic compounds and carbonyl compounds.
- Identify, classify and name carbohydrates, amino acids, nucleic acids, and other biochemical compounds-
- Understand the principles of the Biochemistry connected to living things. by studying heterocycles, nucleic acids, terpenes, steroids, amino acids, proteins, vitamins and carbohydrates

*Syllabus (Appendix-1)

*Learning Resources:

- **Open courseware** related can be connected/downloaded on MIT OCW:
 - **Biochemistry** by Prof. Lander E.&Others; weblink: <https://ocw.mit.edu/high-school/biology/>
 - **Organic chemistry** by Dr. Berkowski K.& Prof Sara O.; weblink: <https://ocw.mit.edu/high-school/chemistry/>

* **Text Books:** * 1. Chemistry and biology of high school Textbooks 11th, 12th
2. Introduction to General, Organic, and Biochemistry. 7th Ed., by Bettelheim F.A. et al., Brooks/Cole, Cengage Learning

* References and Readings:
- Any credible and trusted internet information resources can be utilized

* **Learning Scenarios:** # Self reading of course lectures, textbooks by Bettelheim & watching videos
Solving assignments & other learning activities as described by website of MIT
Discussion with Educators and Profs, peers at university and on the Internet

*Assessment Method:

- Solving exams, and learning activities from OCW website of MIT and Textbooks
- Request Profs, Educators and Others to assess me by asking me questions, assignments and problem solving

Appendix-1

*Tentative Syllabus

Session / Week Date	Topics and learning activities	Learning Resources :	Check& self assessment test, quiz, from MITOCW&Textbooks
session1	Introduction to Organic& Biochemistry chemistry: How they related to each other	1.Highschool Textbooks 11 th ,12 th 2.Battelhiem etal book, ch1	
session2	Alkanes, and Isomerism	1.Battelhiem etal book, ch2 2. .MITOCW_pdf_ files by Berkowski	
session3	Alkenes and Alkynes	1. MITOCW_pdf_ files by Berkowski 2. Battelhiem etal book, ch3	
session4	Benzene and Its Derivatives	1.Battelhiem etal book, ch4 2.high school Textbook11 th , (unit 9)	
Session5	Alcohols, Ethers, and Thiols	1.Battelhiem etal book, ch5 2.MITOCW_pdf_ files by Sara O.	
Session6	Acids and Bases	1.Battelhiem etal book, Ch7 2. high school Textbooks	
Session7	Amines carboxylic acid, aldehydes and ketons	1.Battelhiem etal book, Ch,8,9,10 2. high school Textbooks	
Session8	Anhydrides, Esters, and Amides	1.Battelhiem etal book, ch11 2. . high school Textbooks	
BIOCHEMISTRY			
Session9	Carbohydrates. lipids	1.Battelhiem etal book ch12,13 2. high school Textbooks 3.Lecture video from MIT OCW link: https://ocw.mit.edu/courses/biology/7-01sc-fundamentals-of-biology-fall-2011/biochemistry/macromolecules-lipids-carbohydrates-nucleic-acid/#?w=535	
Session11	enzymes, proteins	1.Battelhiem etal book, ch 14,15 2. high school Textbooks 3.Lecture video from MIT OCW link: https://ocw.mit.edu/courses/biology/7-01sc-fundamentals-of-biology-fall-2011/biochemistry/macromolecules-lipids-carbohydrates-nucleic-acid/#?w=535	
Session12	Chemical Communicators: Neurotransmitters	1.Battelhiem etal book ch16	
Session13	Nucleotides, Nucleic Acids, and Heredity	1.Battelhiem etal book ch17 2.Lecture video from MIT OCW link: https://ocw.mit.edu/courses/biology/7-01sc-fundamentals-of-biology-fall-2011/biochemistry/macromolecules-lipids-carbohydrates-nucleic-acid/#?w=535	
Session14	Gene Expression and Protein Synthesis	1.Battelhiem etal book ch18	
Session15	Bioenergetics: How the Body Converts Food to Energy	1.Battelhiem etal book ch19	
Session16	Summative Assessment Exam		

Note: this Course can be conducted in two levels. I. Organic chemistry, II. Biochemistry